

# PALEONTOLOGY

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**Project title: Depositional Micro-environments and Preservation Potential of Plants and Arthropods in Recent and Fossil Hot-Spring Systems.**

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**Objective:** Recent discoveries of exceptionally preserved early terrestrial plants and animals from the Early Devonian (400 Ma old) Rhynie chert hot spring complex (Aberdeenshire, Scotland, UK) has revealed the potential for exceptional fossilization (including soft tissues) within hot spring systems. The Rhynie complex consists of at least two separate vents, one of which exhibits geyserite splash texture. The current project extends the scope of the study to include recent silica-depositing systems within Yellowstone National Park as analogues for this fossil example. Collections of silica encrusted and silica entombed arthropods (primarily insects) will be examined alongside pre-existing water chemistry data and the geometry and topography of the hosting geothermal features to reveal processes involved in the entrapment and fossilization of organic debris.

**Findings:** Following on from our 1999 summer field season, our fieldwork continued to investigate the potential of different sub-environments in the geyser basins which promoted the preservation through silica encrusting and replacement of macro organic remains (plants and small arthropods). An interesting development in the research was the realization that threads of photosynthetic green alga in relatively cool pools (c. 30 degrees centigrade) could form sufficiently resilient frameworks which trapped and supported organic remains. Subsequently, silicification could take place on these framework templates.

**Project title: A Preliminary Investigation of the Eocene Palynoflora of the Yancey Creek Drainage Basin, Yellowstone National Park, Wyoming**

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Additional investigator(s): Melissa Stefos, Craig A. Chesner

Objective: To document Eocene palynoflora of Sepulcher formation. The purpose of this study is to examine the palynoflora of the Eocene Sepulcher Formation from a previously unstudied location near Yancey Creek, in the northern part of Yellowstone National Park. This is a preliminary investigation that hopes to document the presence of fossil pollen and spores at this site. The long range goal of this project includes extensive sampling resulting in more detailed floristic, paleoecological and stratigraphic analysis than is presently known.

Findings: Five rock samples for palynological analysis were obtained during July 2000 while the Eastern Illinois University Geology Field Camp was observing geological features in the park. The samples are dark brown or gray lithic rich sandstones, siltstones and shales. One gray sandstone specimen contains unidentifiable fossil plant fragments.

Some of the samples have been processed using a density separation and standard acetolysis chemical treatment with microscope slides prepared using a glycerine jelly medium. Thus far, most of the slides have proven to be barren of pollen. However, a few grains have been found and examination for statistically valid numbers of grains is continuing. Additional sample preparation is expected to lead to the discovery of enough palynomorphs to make preliminary scientific conclusions.

At this earliest stage of examination, a few grains of TCT (*Taxodiaceae-Cupressaceae-Taxaceae*), *Juglans*, and *Quercus* have been found. These findings are consistent with those of previous workers in other locations and fit well within the expected outcomes of the project. Details of this study will be posted on the Eastern Illinois University Geology Yellowstone National Park Research Program web site <http://oldsci.eiu.edu/geology/camp/YNP/ynpres.htm>.

#### **Project title: Paleontological Survey of Yellowstone National Park**

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Additional investigator(s): Vince Santucci

Objective: To develop a database of the fossil resources within Yellowstone National Park.

Findings: A significant amount of preliminary work has been accomplished. Vince Santucci has already published on the internet our current knowledge about the paleontology of Yellowstone National Park. The url is: [http://www2.nature.nps.gov/grd/geology/paleo/yell\\_survey/index.htm](http://www2.nature.nps.gov/grd/geology/paleo/yell_survey/index.htm). A manuscript on Eocene mammals from Yellowstone is in progress.